THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today
(1) was not written for publication in a law journal and
(2) is not binding precedent of the Board.

Paper No. 19

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte PETER FISCHER and UWE KECK

Appeal No. 1996-3089
Application 08/006,860[1]

ON BRIEF

Before THOMAS, BARRETT and HECKER, Administrative Patent Judges.

HECKER, Administrative Patent Judge.

DECISION ON APPEAL

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[1] Application for patent filed January 21, 1993.

This is a decision on appeal from the final rejection of claims 1 through 5 and 7 through 9, all of the claims pending in the application.

The invention relates to an improvement of the B+-tree index structure for retrieving information from a computer. B+-trees are characterized in that all key records are stored in the leaf nodes, while other nodes in the tree contain only index entries for routing searches. Information as to which leaf in the tree contains the key records that follow in sequence is not ordinarily contained in the leaf nodes themselves. By adding an additional pointer to each leaf node, Appellants have provided the ability to sequentially access key records in leaf nodes without accessing non-leaf nodes, thus speeding up sequential access.

The only independent claim, claim 1, is reproduced as follows:

1. A computer system for retrieval of information, said computer system comprising storage means being adapted to store an index structure, said index structure comprising:

a tree with one or more paths from a root node

to one or more leaf nodes, each path from the root node to any leaf node of said three having an equal length where the length equals a number of nodes in a path;

one or more keys having said information assigned thereto being stored on one or more of said nodes, each node having at most 2k+1 sons, where k is a natural number, each of said nodes, except said root node and said leaf nodes, having at least one son, and the root node being a leaf node or having at least two sons; and

wherein said leaf nodes of said tree comprise additional pointers, said additional pointers pointing from one of said leaf nodes to another one of said leaf nodes, so that a sequential search of leaf nodes may be performed without searching nodes other than leaf nodes.

The references relied on by the Examiner are as follows:

Bozman 5,089,952 Feb. 18, 1992
Ferguson 5,121,493 Jun. 9, 1992 (filed Jan. 19, 1990)

Claims 1 through 5 and 7 through 9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Bozman and Ferguson.

Rather than repeat the arguments of Appellants or the Examiner, we make reference to the brief and the answer for the details thereof.

OPINION

After a careful review of the evidence before us, we agree with the Examiner that claims 1 through 5, 7 and 8 are

properly rejected under 35 U.S.C. § 103. Thus, we will sustain the rejection of these claims but we will reverse the rejection of claim 9.

At the outset, we note that Appellants have indicated on page 4 of the brief that claims 1 through 5, 7 and 8 stand or fall together (claim 1 will be treated as the representative claim), and claim 9 stands or falls separately.

On pages 5 and 6 of the brief, Appellants argue:

> In FERGUSON the linked-list [of substrings] is used only as a means for sorting a large database of key records in place (i.e., without requiring storage space much larger than the storage space occupied by the key records themselves). Once the key records are sorted in what is called the "merge phase", the key records exist in storage as a linked-list of substrings. This linked-list of substrings is then read in sorted order (using the linked-list pointers) into a buffer that is used to create the tree structure. Once the key records are read into the buffer from which the tree is being formed, the boundaries of the substrings and the pointers linking the boundaries of the substrings have no further function, so this information (the substring boundaries and the pointers linking the substrings) as such **presumably is lost** at this point. (Bold emphasis added.)

At page 5 of the answer, the Examiner responds:

> As noted in the rejection above, Ferguson maintains pointers as [sub]strings are moved

> physically, and there is certainly no proffered reason to destroy the links and **no reason to presume their loss**. (Bold emphasis added.)

Looking at Ferguson, column 9, lines 10-18 we see:

> The sorted substrings are essentially the same as leaf nodes of a tree structure, in that they comprise search keys and pointers to records. Therefore, all that need be done [to construct a tree] is to **treat the linked list of substrings as a set of nodes** (....), **and to create branch nodes** which contain search keys and pointers to **such leaf nodes.** (Bold emphasis added.)

We agree with the Examiner, there is no reason to presume the substring links (i.e., pointers to the next substring) are lost when the substring is treated as a leaf node. Appellants further argue at page 7 of the brief:

> In the present invention, there are also pointers to leaf nodes stored in the branch nodes, but in addition there are **"additional pointers" in the leaf nodes which allow a sequential search of leaf nodes without searching other nodes** (i.e., the branch nodes). The FERGUSON system cannot do this because the leaf pointers needed to accomplish this are not stored in the leaf nodes! The only place where leaf pointers are stored in FERGUSON is in the branch

nodes (in the branch node tables)!(Bold emphasis added.)

However, as we pointed out supra, there is no reason to presume the links (i.e., pointers) of Ferguson's substrings (i.e., leaf nodes) were lost when placed in a tree structure. These links , in substrings now treated as leaf nodes, still point to a subsequent substring (i.e., leaf node). These links are inherently **"additional pointers"** as recited in Appellants' claim 1. Therefore, just as with Appellants' invention, Ferguson's sorted substrings **would allow a sequential search of substrings (i.e., leaf nodes) without searching other nodes**.

Thus, the Examiner has shown how Ferguson meets the argued limitations of claim 1, last paragraph:

wherein said leaf nodes of said tree comprise additional pointers, said additional pointers pointing from one of said leaf nodes to another one of said leaf nodes, **so that** a sequential search of leaf nodes **may** be performed without searching nodes other than leaf nodes.

(Bold emphasis added.)

Although Ferguson does not recite performing a sequential search from substring to substring when arranged in a tree structure as leafs, the existing substring links **would allow** such a search. On the other hand, Appellants' claim 1 **may** allow such a sequential search, but does not **require** one.

For the above reasons, we will sustain the Examiner's rejection of claim 1 under 35 U.S.C. § 103, and likewise the rejection of claims 2 through 5 , 7 and 8 of the same group.

Regarding claim 9, it is the burden of the Examiner to establish why one having ordinary skill in the art would have been led to the claimed invention by the reasonable teachings or suggestions found in the prior art, or by a reasonable inference to the artisan contained in such teachings or suggestions.

In re Sernaker, 702 F.2d 989, 995, 217 USPQ 1, 6 (Fed. Cir. 1983).

"Additionally, when determining obviousness, the claimed invention should be considered as a whole; there is no legally recognizable 'heart' of the invention." Para-Ordnance Mfg. v. SGS Importers Int'l, Inc., 73 F.3d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995), cert. denied, 117 S.Ct. 80 (1996),

citing W. L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983), ***cert. denied***, 469 U.S. 851 (1984).

At page 4 of the answer, the Examiner states:

> The particular choice of keys or the source of substrings given in claim 9 does not affect the claimed structure, means, or method in any substantial way; they lack criticality.

We are not inclined to dispense with proof by evidence when the proposition at issue is not supported by a teaching in a prior art reference, common knowledge or unquestionable demonstration. Our reviewing court requires this evidence in

order to establish a ***prima facie*** case. In re Knapp-Monarch Co.,

296 F.2d 230, 232, 132 USPQ 6, 8 (CCPA 1961); In re Cofer, 354

F.2d 664, 668, 148 USPQ 268, 271-72 (CCPA 1966).

The Examiner has provided no evidence to indicate the text retrieval system of claim 9 would specifically, inherently or obviously incorporate a tree search structure, and has not

established a ***prima facie*** case. Thus we will not sustain the 35 U.S.C. § 103 rejection of claim 9.

In view of the foregoing, the decision of the Examiner rejecting claims 1 through 5, 7 and 8 under 35 U.S.C. § 103 is affirmed; however, the decision of the Examiner rejecting claim 9 under 35 U.S.C. § 103 is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

James D. Thomas)
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